

BIOLOGICAL EVALUATION

Douglas-fir Beetle Infestation

Bill Williams Mountain

Williams Ranger District

Kaibab National Forest

April 1961

By

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INTRODUCTION

Light mortality of Douglas-fir resulting from endemic populations of the Douglas-fir beetle has been observed on Bill Williams Mountain for several years (see attached map). It was not until a year ago, however, that heavy damage began to appear. In the fall of 1960 the Albuquerque Forest Insect Laboratory was requested to make a biological evaluation of the infestation. The writer made the evaluation on April 18 and 19, 1961. Results indicate that the infestation is serious and will continue to cause severe damage.

TECHNICAL DATA

Canal Agent— Douglas-fir beetle, *Dendroctonus pseudotsugae* Hopk.

Host Tree Attacked— Douglas-fir, *Pseudotsuga menziesii* var. *glauca* (Mill.) Franco.

Type of Damage— Damage is severe. In some cases several groups of infested trees coalesce and appear as one large group. Isolated groups range from 8 to 16 infested trees. Approximately 400 trees in the area are infested.

Environmental Factors-- The outbreak is in a virgin mixed conifer type.

Extent of Outbreak-- Damage is occurring on approximately 640 acres and is confined to the mixed conifer type found on north slopes and deep drainages. Spreading will be restricted on Bill Williams Mountain because of the relatively small area occupied by the susceptible type.

THE BIOLOGICAL EVALUATION

Sampling Procedure.

Four 6 x 6-inch bark samples were removed from each of 25 infested trees. Samples were taken on the north and south exposure of each tree at breast height and between 9 and 12 feet. The 25 trees were selected from six groups of infested trees.

Findings.

Complete fading of the infested trees had not occurred. Based on general observations, trees being killed ranged in dbh from 11 to 35 inches with the average approximately 21 inches. Trees selected for sampling were smaller. Their diameter ranged from 11 to 27 inches with 18.5 inches as an average.

A total of 25 sq. ft. of bark was examined (12½ feet at each height). The examinations were made prior to the brood flight but after the brood reached the adult stage. A summary of the biological data obtained is given in Table 1. It is interesting to note that only 28.6 living beetles per sq. ft. of bark were found at 4 to 5 feet, while nearly three times that many (82 per sq. ft.) were found at 9 to 12 feet.

Table 1.-- Biological data obtained from four 6 x 6-inch bark
samples from each of 25 infested trees.

Height sampled: (feet)	Gallery length (inches)	Attacks:	<u>Living brood</u>			<u>Dead brood</u>			Parasites: and predators:	Associates
:	:	:	larvae:	pupae:	adult:	larvae:	pupae:	adult:	:	:
:	:	:	:	:	:	:	:	:	:	:
- Per Square Foot of Bark Surface -										
4-5	24.3	5.2	0.3	0.1	28.2	0.3	0.9	5.7	0.1	1.5
9-12	61.4	10.4	0.1	0.1	81.8	0.4	0.0	13.9	0.6	0.1

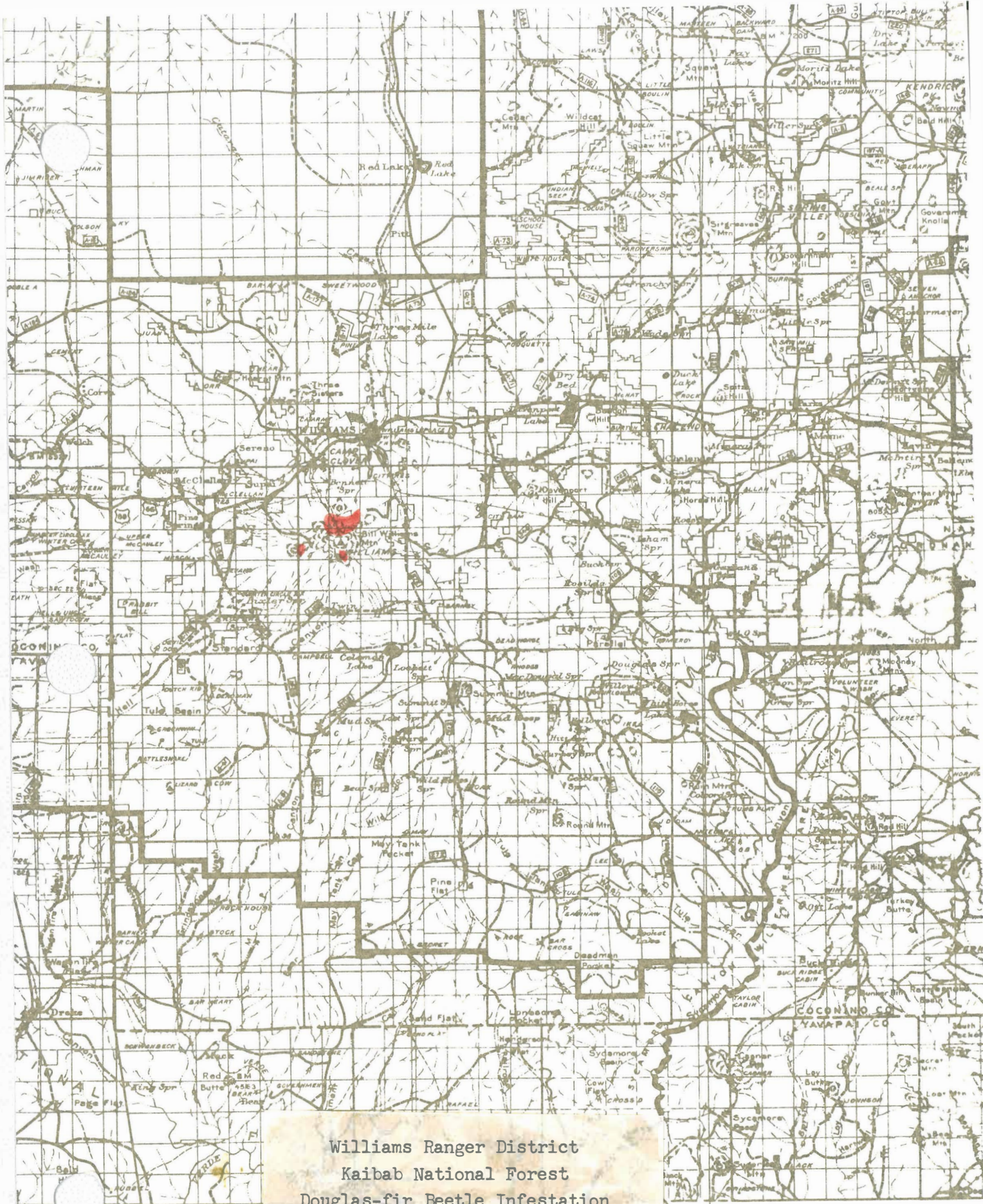
DISCUSSION AND CONCLUSIONS

In addition to the large difference in brood numbers at the two heights sampled (Table 1) the number found in the lower sample is quite variable. For example, 21 of the 50 samples taken at breast height contained no brood, whereas only 1 of 50 at the 9-12 foot level was devoid of brood. Samples at breast height do not appear reliable.

Parasites and predaceous insects are inactive. Apparently they had little effect on the present generation. Seven of the trees sampled showed signs of light woodpecker feeding. Although this predation reduced the insect population to some extent it was not severe enough to influence the infestation trend.

The large number of heavily infected mature trees will give rise to a high and aggressive generation. Tree mortality is expected to be severe in 1961.

Logging of infested trees should reduce volume losses. Logging priority should be given to the old-age Douglas-fir stands. Ethylene dibromide emission can be used to treat the infested trees if the values at stake warrant the cost.



R.1.W.

R.1.E

April 1961

R.4.E

Longitude West

20

10

112 00